FRICTION DRIVING GEAR FOR DYNAMOS.

We illustrate herewith two fine sets of electric light machinery constructed by the Anglo-American Brush Electric Light Corporation, Limited, of London, under the patents of Mr. J. S. Raworth, their superintending engineer. The dynamos are of the Victoria Brush type, and are driven by friction gear after a manner which has been successfully adopted in nearly two hundred large installations. The essential feature of this gear is that the dynamo is hung in a cradle which permits it to respond to the action of the screw which puts the grip on the friction wheels, without putting any extra pressure on the bearings of the armature spindle. The friction pinion is made of compressed paper, and runs in contact with a large cast iron wheel, which also acts as the fly wheel of the engine. The pressure between the two surfaces is obtained by screwed rods, seen at the left hand of the figures. These rods connect two gun metal bearings, which are applied to extensions of the crankshaft and of the armature spindle. Thus the strains due to the pressure between the frictional surfaces are practically confined to the two exterior bearings, and as these are not connected to the framework of either engine or dynamo, their wear does not throw other bearings out of line.

The engine in one illustration has a cylinder 8 inches in diameter by 8 inches stroke. The valve chest is at the back of the cylinder, and the valve is worked through a rocking shaft, this arrangement allowing the engine and dynamo to be included within a length of 5 feet 6 inches, and thus rendering it applicable in very confined spaces. The engine shown in the other view is of Raworth's compound high speed type. It has cylinders 7 inches and 12 inches in diameter by 8 inches stroke, working on two cranks set 180 degrees apart, so that the pistons and connecting rods balance each other. There is a single bearing between the two cranks, the second bearing of the shaft being at a considerable distance, close to the fly wheel. As the two cylinders balance each other, the stresses on the cranks are equal, and consequently there is but little friction on the intermediate bearing, the engine running very light in consequence. The low pressure valve chest is seen in front, that of the high pressure cylinder being behind the governor.

These two sets of electric lighting machinery were exhibited at Manchester, and attracted a large amount of attention. They are designed to feed 140 and 300 lamps respectively, and are specially distinguished by their compactness and lightness. On shipboard they have been very successful, and have met with the warm approval of sea-going engineers, who find some of the high speed engines difficult to understand and impossible to keep in satisfactory order. The engines work with a small expenditure of fuel, and are provided with ample bearing surfaces and the most perfect lubricating appliances, so that they can run for days together without a stop, either for oiling or for setting up the brasses. In land installations, particularly those in London clubs and hotels, the small space occupied by this plant often renders it possible to introduce electric light when otherwise it would be inadmissible, while the directions of the motion and its high efficiency secures for it the approval of those who delight in a neat and workmanlike piece of machinery.—*Engineering.*

Our Ships and Railways.

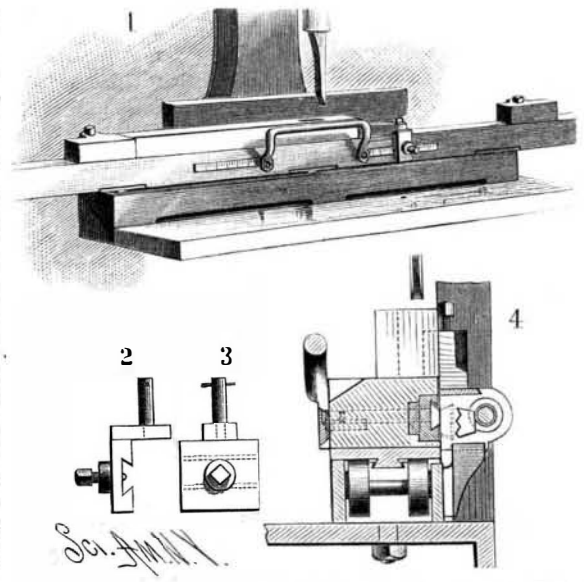
Ever since the birth of the republic it has been illegal for the vessels of any foreign power to engage in our coasting trade.

Why should it not be speedily made illegal for the Canadian railroads to engage in carrying goods and passengers between our Eastern and Western cities? The cases are exactly parallel. If we protect our ships against the competition of foreign ships, why shouldn't we protect our home railroads against those running just outside of our northern borders? Let Congress think about this.—*N. Y. Sun.*

[We have an interstate law intended to suppress the old railway practice of transporting freight for long distances at less rates than were charged for short distances. But at present this law is in part nullified by railway connections with the Canadian roads, by which cheaper rates are obtained *via* Canada between certain parts of the United States than by our own direct lines.]

IMPROVED ATTACHMENT FOR MORTISING MACHINES.

An attachment designed to be held on the top of the table of a mortising machine of any approved construction, to facilitate the accurate forming of a mortise at each end of a piece of wood, is shown herewith, and



BULLIS' ATTACHMENT FOR MORTISING MACHINES.

has been patented by Mr. Henry M. Bullis, of Traverse City, Mich. The bed of the attachment, which is fastened to the table, is provided with rollers, which support a sliding carriage on guides, each of which has in its middle a longitudinally extending dovetail fitting into a corresponding groove in the transverse partitions shown in the cross section, Fig. 4. In Figs. 2 and 3 are shown end and side views of a sliding block for supporting a rest. An upward motion of the carriage is prevented by the dovetail, and its longitudinal movement, by the operator taking hold of the handle, is limited by guide blocks secured to the inner ends of dovetailed strips sliding in a dovetail groove extending the length of the carriage at the rear. Guide blocks carry a rule to indicate the length of the stroke of the carriage or the length of the mortise to be made, and in the groove in the rear of the carriage are adjustably held dovetailed graduating strips, on each of which is held to slide a block on which is fastened a rest held on the top of the carriage. The wood to be mortised is placed on top of the carriage, with its outer end against the rest and its rear against the face of a guide, the inner end of the wood directly under the mortising tool, the rest being set so that when the attachment is in the position shown in Fig. 1 the mortising tool is at the extreme outer end of the mortise to be formed. The mortising machine is then set in motion, the tool operating on the wood, and the operator moving the carriage by the handle in either direction, first forming the mortise in one end and then in the other. Each operation makes a mortise half through the timber, when the wood is turned over and the stops on the other side of the attachment are used.

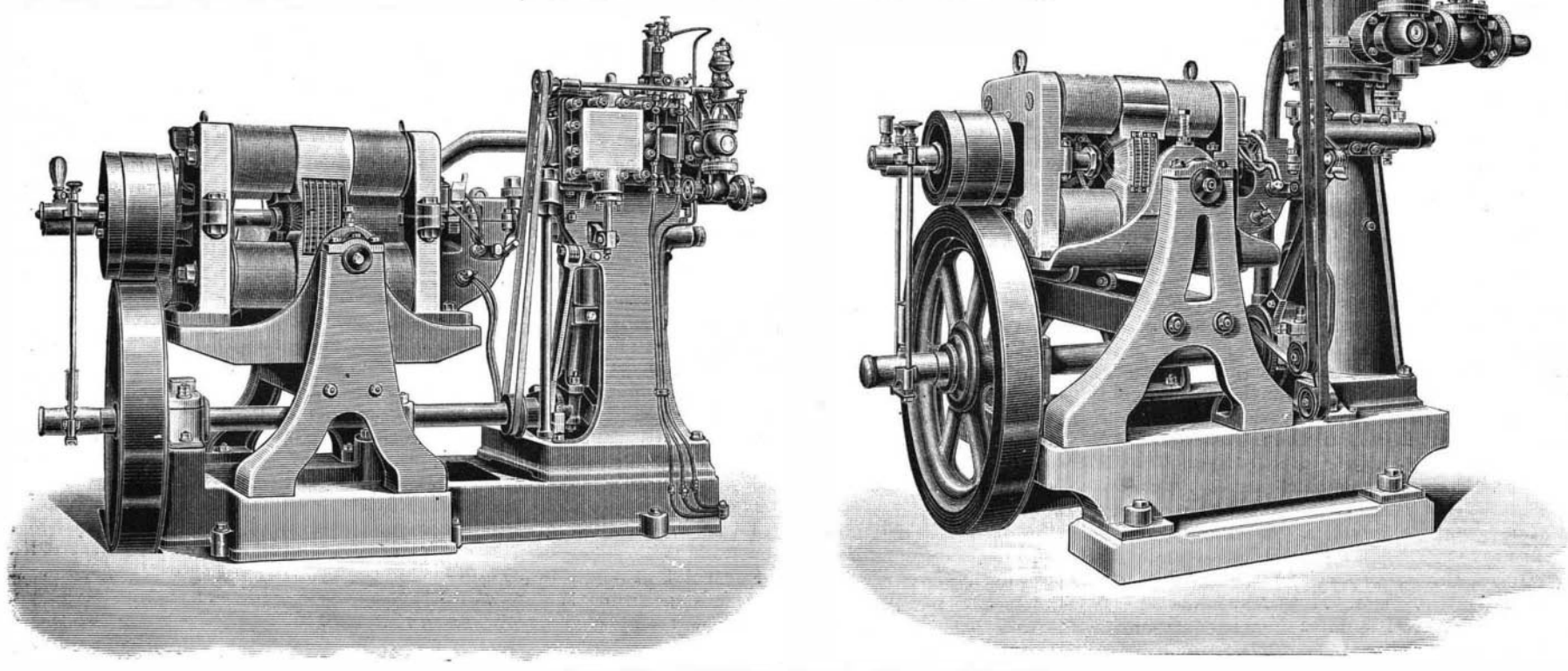
Using up the Scraps.

The utilizing of materials formerly wasted has been frequently referred to in these columns, and a long list of the articles made from such waste specified. The *Baltimore Sun*, referring to this subject, mentions three waste materials now utilized in that city:

"Every resident," the writer says, "can recollect the immense piles of waste tin from the can shops that used to glitter in the hollows of East Baltimore and upon every dump in that section a dozen years ago. The first use of this waste was by a poor man from the North, who obtained permission to set up a machine in Smith & Wicks' can shop in this city. Here he bought scraps for almost nothing, and cut out tin button stock to send East. Afterward the stamps for shaping the buttons were introduced, and the individual reaped a large fortune from his enterprise. The next use of tin scrap was for smelting. The tin at first refused to flow when subjected to the heat of the furnace. It was discovered that it would pay to cut the tin coating chemically, and that the sheet iron would then smelt and flow. Out of this grew the manufacture of sash weights, and few of them are now found that are not made from tin scrap. Several foundries use all that is made. The scrap was pounded into wads by stamping it in large buckets.

"A most interesting feature of all businesses using leather is that not one particle of the leather is wasted. Our shoe factories alone sell annually fifty tons of waste. This goes mainly to a firm in Philadelphia, who pay $7 a ton for it. A large amount is sent to Lynn, Mass., and other points, where the leather is ground up, mixed with a medium, and pressed into buttons. The remainder that is not so used is treated chemically, turned into a gelatinous mass, dried, and ground into a fertilizing dust. The sole leather pieces that fall from the block of the heel stamper are sorted into two heaps. The very fine pieces are put with the fine waste. The scraps, presenting a surface of a couple of square inches, are barreled up and sold to parties in New York or Boston at one cent a pound, where they are put through a peculiar machine. This instrument splits the pieces nearly through. Then it opens the piece thus cut like a book. Thence it is delivered from between rollers, and is large enough to be again sent to the factory to be cut up into heel lifts.

"There is another small but important industry which goes to prove how ordinary wastes of business may be turned to account. This is a work of long standing, though not generally known. In every photograph gallery there is annually a large amount of waste silvered paper. This is all thrown into a box and is bought or exchanged for nitrate of silver. The comparatively small amount collected in one gallery aggregates a great mass when all the galleries are considered. This paper is burned, and the silver that is extracted from the residue pays sufficiently at least for a good living. The time was, not very remote, too, when the coal tar from gas houses was a nuisance in every harbor. Now every bit of the tar is utilized, and some of the finest dyes ever known are made from it."



FRICTION DRIVING GEAR FOR DYNAMOS.